

Applicant:  
For:

Warren  
Foldable Member

1 1. A foldable member comprising:  
2 at least a first tube;  
3 at least one predetermined hinge area along the length of the  
4 first tube; and  
5 opposing sets of elongated slots in the tube at the hinge area  
6 thereof forming separated longitudinal strips of tube  
7 material between the slots which fold when subjected to localized  
8 buckling forces,  
9 each slot of each set of elongated slots separated  
10 longitudinally along the length of the tube from each adjacent slot by  
11 a bridge element of tube material.

1 2. The foldable member of claim 1 in which the opposing sets of elongated  
2 slots are diametrically opposed from each other on the tube.

1 3. The foldable member of claim 1 in which each slot in each set of slots is  
2 diametrically opposed from a slot in the opposing set of slots.

1 4. The foldable member of claim 1 in which there are two sets of slots.

1 5. The foldable member of claim 4 in which there are two slots in each set of

2 slots.

1 6. The foldable member of claim 1 in which there are two sets of slots and  
2 two slots in each set.

1 7. The foldable member of claim 1 in which there is a stress relieving  
2 member attached to each bridge element on the inside of the tube.

1 8. The foldable member of claim 1 in which the tube is made of a plastic  
2 material.

1 9. The foldable member of claim 1 in which the tube is made of a composite  
2 material.

1 10. The foldable member of claim 9 in which the composite material includes  
2 a triaxial braid of fibers in a resin matrix.

1 11. The foldable member of claim 1 in which there are a plurality of hinge  
2 areas spaced from each other along the length of the tube, each hinge area including  
3 opposing sets of elongated slots.

1004434-011000

1           12.       The foldable member of claim 1 further including an electrical conductor  
2 disposed in the tube.

1           13.       The foldable member of claim 1 further including at least one transducer  
2 device located proximate a hinge area for controlling the folding of the longitudinal strips  
3 of tube material.

1           14.       The foldable member of claim 1 further including slot reinforcing  
2 members disposed in the slots.

1           15.       The foldable member of claim 1 in which the elongated slots are triangle  
2 shaped.

1           16.       The foldable member of claim 1 in which the elongated slots are diamond  
2 shaped.

1           17.       The foldable member of claim 1 in which there are four slots in each set of  
2 slots, each slot of a pair of the four slots opposing another slot.

1           18.       The foldable member of claim 1 in which each slot has a reduced diameter  
2 portion.

1           19.       The foldable member of claim 1 further including a second tube disposed

2 inside the first tube.

1 20. The foldable member of claim 19 in which the second tube includes  
2 opposing sets of elongated slots at the hinge area thereof.

20110101 01:10:10

2025 RELEASE UNDER E.O. 14176

- 1        21.        A collapsible structure comprising:
- 2                    a plurality of joined members;
- 3                    a selected number of said members each including:
- 4                        a tube;
- 5                                at least one predetermined hinge area along the
- 6                    length of the tube; and
- 7                        opposing sets of elongated slots in the tube at the hinge area
- 8                    thereof forming separated longitudinal strips of tube material
- 9                    between the slots which fold when subjected to localized buckling
- 10                   forces,
- 11                        each slot of each set of elongated slots separated
- 12                    longitudinally along the length of the tube from each adjacent slot by
- 13                    a bridge element of tube material.

10044434-011002

1 <sup>1</sup> ~~22.~~ A foldable member comprising:  
2 at least a first tube made of layers of material;  
3 at least one predetermined hinge area along the length of the first  
4 tube; and  
5 a plurality of opposing elongated slots in the tube through the  
6 layers of material forming separated longitudinal strips of layers of tube  
7 material between the slots which fold when subjected to localized  
8 buckling forces.

1 <sup>2</sup> ~~23.~~ The foldable member of claim ~~22~~<sup>1</sup> in which first tube includes a sheet of  
2 plastic material wrapped around itself several times forming the layers of tube material.

1 <sup>3</sup> ~~24.~~ The foldable member of claim ~~23~~<sup>2</sup> further including an adhesive securing  
2 the layers of plastic material to each other at selected locations along the length of the  
3 tube.

1 <sup>4</sup> ~~25.~~ The foldable member of claim ~~24~~<sup>3</sup> in which the adhesive is a tape.

1 <sup>5</sup> ~~26.~~ The foldable member of claim ~~24~~<sup>3</sup> in which the sheet of plastic material  
2 comes from a roll of plastic stock material and has a round memory.

1 <sup>6</sup> ~~27.~~ The foldable member of claim ~~22~~<sup>1</sup> in which the layers of material are  
2 laminated to each other except at the predetermined hinge area.